DOCUMENT RESUME

ED 324 355 TM 015 620

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TITLE The Acquisition of Reading Skills across Development: A Process Model for Achievement.
PUB DATE Mar 89
NOTE 32p.; Paper presented at the Annual Meeting of the American Educational Research Association (San Francisco, CA, March 27-31, 1989). For a related document, see TM 015 621.
PUB TYPE Reports - Research/Technical (143) -- Speeches/Conference Papers (150)

EDRS PRICE MF01/PC02 Plus Postage.
DESCRIPTORS *Academic Achievement; *Child Development; Early Experience; Educational Experience; Elementary Secondary Education; Extracurricular Activities; Family Environment; *High School Seniors; Individual Development; Measures (Individuals); Models; Predictor Variables; Preschool Education; *Reading Achievement; Reading Skills; Reading Tests; *Skill Development; *Student Development
IDENTIFIERS *Process Models; Reading Biographer

ABSTRACT

A model was developed to relate home, school, and extracurricular experiences (from preschool through high school) to the reading achievement of high school seniors. Variables representing each of these factors were measured using "The Reading Biographer," an instrument that had been evaluated in a national follow-up study of 3,959 high school seniors. Data from a sample of 2,177 of these students were placed in three categories, i.e., higher, moderate, or low involvement on each of nine variables representing home, school, or extracurricular activities at preschool, elementary school, or high school levels. Mean reading scores were computed for each of the involvement levels of all nine factor variables, and an analysis of variance identified variables that yielded significant differences. Regression equations for various subgroups of interest were used to validate the model across social class and gender subgroups. Results reveal that common factors were important for all subgroups in acquiring adult reading skills. An unexpected result was that early childhood experiences were important in predicting adult reading status. Three tables and two figures summarize study data. (Author/SLD)

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THE ACQUISITION OF READING SKILLS ACROSS DEVELOPMENT: A PROCESS MODEL FOR ACHIEVEMENT

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THE ACQUISITION OF READING SKILLS ACROSS DEVELOPMENT: A PROCESS MODEL FOR ACHIEVEMENT[1]

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ABSTRACT

This study developed a model of factors representing home, school, and extracurricular experiences, from preschool through high school, related to the reading achievement of high school seniors. Variables representing each of these factors were measured using a new instrument called *The Reading Biographer*. The model was evaluated in a national follow-up study (Hanson and Siegel, 1988a) which included information from 3,959 high school seniors. Data from a sample of these students (N=2,177) were placed in three categories (i.e., high, moderate, or low) on each of nine variables representing home, school, and extracurricular experiences at three schooling levels (i.e., preschool, elementary, and high school). Mean reading scores were computed for each of the three levels of involvement for all nine of the factor variables and an analysis of variance identified those variables that yielded a significant differences ($p<.05$). The data were then entered into regression equations for various subgroups of interest (i.e., overall sample, males and females, and high, middle, and low SES) for the purpose of validating the model across social class and gender subgroups. Results showed common factors were important for all subgroups in acquiring adult reading skills. It also showed the unexpected results that early childhood experiences were important in predicting adult reading status.

The notion that there is an environmental "press" for the development of specific traits and skills was suggested by the research of Henry Murry (1938) and developed further in the work of Stern, Stein, and Bloom (1956). The central thesis of this research is that a set of factors, referred to as a "press", works across development and directly impacts the acquisition of specific skills and abilities. Further, the components of the "press" for the development of a particular trait can be identified, measured, and their impact evaluated in empirical studies.

[1]Paper presented at the annual meeting of the American Educational Research Association, San Francisco, CA, March 27-31, 1989.

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The present study was a quest to identify and assess the components of the "press" for literacy. It sought to specify the various kinds of educational experiences that children have over the course of development and determine which ones have a long-term impact on reading ability. By identifying and measuring the components of the "press" for literacy, a model for predicting adult literacy can be derived. This model would then be useful to both parents and educators in determining the kinds of experiences and interventions that they should provide in order to ensure that children become literate adults. Although this "press" approach has not usually been applied in research on reading, the present study sought to develop the required methods and procedures for a model of reading development and to evaluate the resulting model in a large scale study.

Objectives and Major Research Question

The purpose of this study was to identify those particular experiences, from preschool through high school, that were related to student reading achievement and determine which ones were essential in terms of adult reading ability. This study sought to develop a longitudinal process model of reading skill acquisition using data gathered from a large national sample (N=2,177) of of high school seniors. The major objectives were to: (1) develop a model of factors representing specific home, school, and extracurricular experiences, from preschool through high

school, that prior research had found to be related to reading achievement; and (2) evaluate their relative importance at three separate schooling levels. These objectives were accomplished through the analytical and empirical analyses of a portion of the Kindergarten Follow-up Study (KFS) data that were gathered for the purpose of assessing the long-term effects on high school seniors of leaning to read in kindergarten (Hanson and Siegel, 1988a). This paper addresses the basic research question, "What specific home, school, and extracurricular reading-related experiences, at the preschool, elementary and high school levels, are related to the reading achievement of high school seniors?"

Background

A nationwide implementation of a kindergarten reading program in 1973-74 (Hanson and Schutz, 1975; 1978) provided the detailed data which was used as the basis for a 1986 kindergarten reading follow-up study (the KFS project), funded by the U.S. Department of Education (Hanson and Siegel, 1988a). The KFS project linked follow-up data with the 1973-74 kindergarten reading evaluation data. In 1987, the KFS Project data were used to derive a process model for reading achievement that challenges the romantic, developmentalist philosophy that readiness for any task has its roots in the biological/maturational makeup of children and that parents and teachers can do little to influence it

(Siegel, 1987). This paper presents the longitudinal process model produced by that research and describes the specific experiences, at each schooling level, found to be related to the reading achievement of high school seniors.

Research Strategy

A starting point for this effort was to define the framework for describing and compiling the needed data. To do this some general guidelines were developed for selecting and configuring the factors related to reading achievement. First, the factors had to represent reading-related experiences from the three domains most influential in a child's life: home, school, and extracurricular experiences. Second, the factors had to represent experiences from each of these three domains over a twelve-year period of time in order to adequately describe the student's reading-related history. Third, only factors that had been identified in previous studies, or that were logically anticipated to be related to adult reading levels, would be included in the study. Using these guidelines, a data collection instrument was developed for the purpose of measuring reading-related experiences from the home, school, and extracurricular domains at three points in time: (1) the preschool years, or years prior to formal schooling, (2) the elementary school years in which reading instruction is paramount, and (3) the secondary school years in which reading skills are extended

and consolidated. Figure 1 represents the model for this instrument called *The Reading Biographer*.

Age	Schooling Levels	Reading-related Experiences Within Each Factor Domain		
0-4	Preschool	Home/Family Experiences	Formal Schooling Experiences	—
5-12	Elementary	Home/Family Experiences	Formal Schooling Experiences	—
13-18	Secondary	Home/Family Experiences	Formal Schooling Experiences	Extracurricular Experiences

Figure 1. Conceptual Design for the Reading Biographer.

The preschool environment was defined as the level to which the student's preschool experiences nurtured or prepared the child for reading. Indicators of nurturance of reading and language skills included the frequency and type of parent-child interactions, the amount of time the child spent in the company of parents, particularly with the mother, and participation in formal preschool educational programs such as Head Start.

During the elementary years, reading skills are developed through experience in the home and school. Some factors from the family setting include the level to which the family provides a positive, reasonably structured and stable home environment (Chall & Snow, 1984); the level to which the parents are involved in the schooling process and; the amount of reading-related homework completed.

The school impacts the reading skills of the students through the type of curriculum and/or tracking system that the student follows (i.e., compensatory, mainstream, accelerated). During the secondary years, these same classes of variables would be expected to continue influencing the development of student reading skills. In addition, the influence of parental role models would be expected to become more important. Finally, the activities of the student (i.e., where and how the teenager spends time and energy) have been found to have an impact on the development of reading skills (Levine, 1965; Marston, 1982). Linked to this would be the resources that the student accumulates, such as books, magazines, reference materials, as well as other material goods in the home.

Database Description

The KFS follow-up database consists of a self-report history of reading-related experiences obtained from a national sample of 3,959 high school seniors, as well as their vocabulary and norm-referenced reading scores as seniors in high school. This sample represented 24 school districts from every region of the United States. The complete description of the KFS sample is provided in the technical report (Hanson and Siegel, 1988a).

Study Design

Study design decisions sought to examine reading achievement as unconfounded as possible. Research has shown that the racial/ethnic background of students is a significant factor in measures of student achievement (for a review see Wigfield and Asher, 1984), therefore, a decision was made to identify one racial/ ethnic group within the KFS sample and conduct the analyses on this population alone. Using this homogeneous sample of students provides a control for, and thus minimizes, the differences associated with racial/ethnic background. The sample population for the present study included only those students who classified themselves as white, non-Hispanic. This resulted in a sample of 2,177 students, or 53 % of the full KFS sample of 3,958 students.

In addition, the decision was made to replicate all findings across social class (SES) and gender populations. Replicating the findings across these populations of interest provides an indication of the generalizability of the findings and thus would have stronger implications in terms of educational policy. More importantly, it would provide a control for SES differences. In virtually all major national studies of educational achievement and attainment, SES emerges as the clearest, single predictor of achievement. Typically the relationship is r=+.40 to +.50 between SES and achievement test scores.

By carrying out all analyses within SES and gender groups, the study sought to identify those factors that operate independently of social class membership and gender. The identification of these factors provides critical information for parents and schools; they are the kinds of experiences that are "alterable" (Bloom, 1984) and, hence can be changed or modified to enhance student achievement. By measuring factors found to be related to reading achievement from previous studies and identifying those which are related to reading achievement at each schooling level, independent of social class or gender, the specific activities and experiences across development that engender adult literacy, can be described.

Of special interest was the early childhood period. A central thesis of studies by Bloom (1964;1974;1980), Walberg (1979) and others (for a review see Mason, 1984) is that early childhood is critical in terms of children's intellectual development and later school achievement. These studies contend that the kinds of educational experiences children have during this early period of development contribute to their later success in school. Other studies, however, have argued that the educational advantage acquired by some children during early childhood (i.e., 2 through 7 years) does not have any long-term effects. That is, schooling produces an equalizing effect and any advantage students have upon entering school, no longer exists by the time they are seniors in high school. Another contention

that has strongly influenced school policy in regard to the early childhood curriculum and school entry age is that early acceleration practices (e.g., early reading instruction) are actually harmful to children in the long run (See Rowley, 1986). Hence, the early educational and reading-related experiences of children tend to be undervalued and underresearched in regard to long-term effects. Moreover, even if early educational experiences were more critical than interventions and experiences occurring later in development, being able to detect any long-term effects (i.e., over 12 years or more) presents a major methodological problem to longitudinal and follow-up research and, thus, was a principle concern of this study.

Subjects

The KFS database was used in its entirety with one exception; students from minority groups were not included in this study. As stated earlier, these students were excluded in order to create a more homogeneous sample and control for variability associated with ethnic background. Thus, the total number of subjects for the present inquiry was 2,177. As shown in Table 1, the sample included approximately an equal number of male and female subjects and represented all three socioeconomic groups. Most of the students, however, fell into the low SES category (as defined by the U.S. Bureau of the Census, 1963).

Table 1. Sample description.

Gender Groups	Social Class Groups Low N	Middle N	High N
Missing	1	1	
Males	662	390	88
Females	594	359	82
Totals:	1,257	780	170

Procedures

An initial step was to identify and compile a list of process factors found to be related to the reading achievement of students. A review of the literature, which included national studies of general achievement as well as those pertaining only to reading, identified factors related to the reading achievement of students at the preschool, elementary and secondary levels, in the arenas of home, school, and extracurricular (e.g., clubs, sports, jobs) experiences. Operationally defined items were created to address those measurable experiences, from early childhood through young adulthood, that either had been identified in earlier research, or were logically anticipated to be related to adult reading levels.

These items were used to compile *The Reading Biographer*, the questionnaire section of a three-part data collection booklet developed as part of the KFS project. *The Reading Biographer* has five major sections. The first three sections correspond to the three educational time periods of

preschool, elementary school, and secondary school. Within each of these time periods, a series of questions is presented that pertain to home/family, school, and extracurricular experiences which might be expected to influence the development of students' reading skills. This section provides additional dependent variables on students' current amount of leisure reading and their level of interest in and attitudes toward reading. The last section collects standard demographic information. Two of these variables, gender and social class, were included in this study.

After *The Reading Biographer* was constructed, it was field tested on three separate occasions. These field tests were carried out in actual school settings with samples of the targeted population in the context of operational use. After each field test, the booklet was reviewed to confirm technical aspects, specification requirements, and logistical procedures, as well as to identify short-comings. The results were used to make necessary adjustments and improve the quality of the instrument. The complete research efforts that went into the construction of this instrument are presented in the KFS Technical Report (Hanson and Siegel, 1988a).

Response items from *The Reading Biographer* were aggregated to create nine predictor variables (Siegel, 1987). These computed variables, representing home, school, and extracurricular experiences at the three schooling levels, were then "clustered" together to represent the factors: (1)

Home, (2) General Schooling, (3) Remedial, (4) Excelling, and (5) Optional experiences. The factor "General Schooling" contained the subcategories of: "Preschool" General Schooling, "Elementary" General Schooling, and "High School" General Schooling experiences. Likewise, the factor "Home" contained the subcategories of: "Preschool" Home, "Elementary" Home, and "High School" Home experiences. These nine cells (i.e., "Preschool" Home, "Preschool" General Schooling, "Elementary" Home, "Elementary" General Schooling, "High School" Home, "High School" General Schooling, "Excelling", "Optional", and "Remedial") represented the major experiences that influenced students' reading achievement across the course of their development. For the sake of clarity and consistency, these nine factor cells are referred to as the predictor variables.

The students were then categorized by their level of involvement in each of these nine predictor variables. This created three student-level comparison groups within each of the nine predictor variables: High Involvement, Moderate Involvement, and Low Involvement. For example, if a student received a score that fell into the "Low" category on the "Preschool" General Schooling predictor variable, this would indicate that the student did not have many formal educational experiences at the preschool level. The mean reading score for each comparison group (i.e., level of student involvement) for each predictor variable was computed. The expectation was that the three reading score

means for each predictor variable would show a pattern of change associated with the level of student involvement (i.e., High, Moderate, or Low involvement). This pattern of change in mean reading scores would range from low to high, or high to low, as the level of the students' involvement in the particular experiences (predictor variable) moved from Low to Moderate to High.

Each of the nine predictor variables were analyzed in terms of the mean reading score pattern they produced for the overall population as well as for gender and social class populations. Mean scores for each predictor variable were computed for social class, gender, and high school subgroups to see how these patterns compared with those of the overall sample. From a very practical standpoint, this procedure allowed those factors influencing reading achievement at each schooling level to be easily identified by the pattern of mean reading scores they produced. For example, if the scores followed a pattern of significant change from low to high across the three categories of comparison, the assumption would be that the greater involvement in these kinds of experiences, at that particular schooling level, the higher the students' overall reading achievement as a senior in high school. In addition, those predictor variables that maintained the same gradation patterns across social class (SES), gender, and high school subgroups would be particularly significant since they revealed experiences associated with reading achievement independent of social

class, gender, or where the student attended high school. If these same patterns of mean reading score change were consistent across these diverse populations, the findings would be generalizable; these would be the kinds of experiences that could overcome variances that exist among high school, gender and social class populations and would have major implications for educational policy.

An analysis of variance (ANOVA) was computed to determine if there was a significant difference among the reading scores in each of the three comparison categories when both the individual and high school were the unit of analysis. ANOVA and a posteriori tests of significance were computed for gender and social class populations using the individual as the unit of analysis (Siegel, 1987).

The nine predictor variables were then entered, in order, into six separate regression analyses using groups defined by total sample, the two gender groups (male/female), and three SES groups (low, middle, and high). This resulted in a general model for reading achievement that could be examined for the three social class and two gender subgroups.

Results

By examining the mean reading score patterns, as well as the ANOVA and a posteriori tests of significance ($P<.05$), for each of the nine predictor variables, all nine predictor variables were found to contribute to the reading achievement of high school seniors. The results of the analyses indicate

that reading achievement is not only a product of the kinds of achievement-related experiences and activities provided by the parents, the school, and the students themselves, but also the level of the student's involvement in them. As indicated by Tables 1 and 2, all of the predictor variables, in both individual and high school levels of analyses, show a consistent pattern of change in mean reading scores across the three comparison categories. Further, the differences in these scores were statically significant. This indicates that the level of involvement in all nine of the predictor variables is related to students' overall reading achievement as a young adult.

In examining Tables 1 and 2, it can be seen that eight of the nine predictor variables indicate a consistent gradation pattern of mean reading score change associated with the level of involvement. The Elementary Home Experience variable, however, digresses slightly form this usual pattern. Although it conforms to the expected pattern of change in moving from Low Involvement to High Involvement, it does not do so in moving from Moderate to High. This was unexpected and requires investigation beyond the scope of this study.

Table 1. Summary of mean reading scores within each predictor variable comparison category for the overall population with the student as the unit of analysis.

Predictor Variables	Comparison Categories Low	Moderate	High	F
Preschool Home Experiences	13.5	14.5	15.2	27.31*
Preschool General Schooling Experiences	13.8	14.6	14.8	10.46*
Elementary Home Experiences	13.7	15.0	14.5	17.23*
Elementary General Schooling Experiences	13.3	14.4	15.1	24.66*
Remedial Schooling Experiences	15.3	13.4	12.6	70.15*
High School Home Experiences	13.1	14.5	15.5	52.73*
High School General Schooling Experiences	12.5	14.0	16.0	129.80*
Excelling Experiences	13.4	14.0	15.7	59.05*
Optional Experiences	15.7	14.4	13.3	39.96*

*P<.0001

Table 2. Summary of mean reading scores within each predictor variable comparison category for the overall population with the high school as the unit of analysis.

Predictor Variables	Comparison Categories Low	Moderate	High	F
Preschool Home Experiences	13.44	14.53	15.20	27.41*
Preschool General Schooling Experiences	13.82	14.58	14.82	10.44*
Elementary Home Experiences	13.68	15.00	14.49	17.32*
Elementary General Schooling Experiences	13.33	14.41	15.11	24.66*
Remedial Schooling Experiences	13.30	13.43	12.58	70.28*
High School Home Experiences	13.08	14.50	15.45	52.87*
High School General Schooling Experiences	12.48	13.99	15.96	130.02*
Excelling Experiences	13.35	13.98	15.73	59.18*
Optional Experiences	15.70	14.38	13.28	40.09*

*P<.0001

Those predictor variables with consistent patterns of significant mean reading score change across all social class and gender populations were: "High School" General Schooling Experiences, Remedial Experiences, and Optional Experiences. The level of student involvement in "High School" General Schooling experiences indicated the greatest overall positive effects associated with high reading achievement while Remedial and Optional experiences both produced reverse patterns of mean reading scores. That is, instead of moving

from low to high, the scores on these two variables moved from high to low. This consistent pattern of negative effects suggests that the greater the level of students' involvement in such activities as part-time jobs, watching TV, socializing with friends, remedial classes, and/or repeating grades, the lower their overall reading achievement as seniors in high school.

The results of the regression analysis indicated that the overall regression model accounted for over 16% of the variance in the reading achievement of high school seniors and produced a Multiple R of .41. With the exception of slightly lower results for the High SES groups (R=.30), results for the other groups (i.e., Low SES, Middle SES, Male, and Female) were all comparable (R=.40). Overall, the predictor variables had more of an effect on the low and middle SES populations than on the upper SES population and the specific variables that contributed to reading achievement, with few exceptions, were common across social class and gender subgroups (Siegel, 1987).

Figure 2 presents the specific experiences within each of the nine predictor variables that showed a relationship to the reading achievement of high school seniors. This longitudinal process model suggest that the kinds of experiences that parents and teachers provide for children, at each schooling level, do make a significant difference in

School Levels	HOME PROCESS FACTORS (positive)	GENERAL SCHOOLING PROCESS FACTORS (Positive)	REMEDIAL PROCESS FACTORS (Negative)	EXCELLING PROCESS FACTORS (Positive)	OPTIONAL PROCESS FACTORS (Negative)
Pre-School (1 to 5 Years)	Educational Activities Encouraged;	Sunday School Classes; Special Lessons; Preschool Classes			
Elem. School (Grades: K-6)	Home Rules; Educational Activities Encouraged	Homework; School Attendance; Project Work	Held Back in Elem. School; Placed in Remedial Classes During Elementary &/or High School; Suspended During Elementary &/or High School; Held Back in High School	Placed in an Honors/Gifted Class during Elementary &/or High School Participated in Organized Extra-Curricular Act.	Socializing With Friends; Watching TV; Part-Time Jobs; Hobbies
Second. School (Grades: 7-12)	Home Rules; Educaational Activities Encouraged; Parents'Educational Expections	Homework; Enrolled in Academic Track; Enrolled in Core Subjects - Lang., Math, Sci.; School Attendance			

Figure 2. Model of home, school, and extracurricular reading achievement variables at three schooling levels related to adult reading achievement.

their reading abilities as young adults. These findings suggest that during the preschool years, children should be stimulated with reading, language, and other educational experiences. Such activities as learning nursery rhymes and stories, watching Sesame Street, playing word and number games, being read to, attending nursery/preschool, and participation in special lessons such as swimming, dance, or music are all positively related to students' reading ability in high school. That is, students with more of these kinds of experiences during their preschool years would be expected to have higher reading ability as high school seniors than students who have less.

Parents should also provide guidelines for children's behavior and encourage participation in reading and reading-related activities through high school. For example, having rules concerning the student's bedtime, household chores, and/or homework, along with giving rewards for school work, providing books and magazines, and taking the student to the library, museum, and concerts, all contribute to the level of a student's reading achievement in high school. Finally, parental expectations in regard to students' educational attainments are extremely important in regard to long-term reading ability. Children who do well in school, and/or plan to continue their education beyond high school, have parents or guardians who expect them to do so, as well as provide them with support and encouragement.

In regard to elementary and secondary schooling experiences in general, students at all grade levels should participate in activities and classes with an academic emphasis and avoid remedial classes and/or repeating grades. The more classes and situations in which students participate that have an academic and/or accelerated emphasis, as opposed to a non-academic and/or remedial emphasis, the higher their reading achievement can be expected to be their senior year of high school. Also, students with good school attendance records attain higher levels of reading achievement than those with poorer ones. More specifically, at the elementary level, students who spend more time in such academic activities as writing stories or papers, doing math problems, reading books, working on science projects, and/or working on spelling and language lessons have a higher level of reading achievement than those who spend less.

At the secondary level, students who spend more time in organized extracurricular activities such as academic clubs, sports, student government, band and/or special lessons, have higher reading achievement scores as high school seniors than those who spend more time in unorganized extracurricular activities, such as watching TV, talking on the phone, or socializing with friends. Also, students who enroll in the academic track, as opposed to the vocational track, and/or those who take additional math, science, and language (English and foreign) courses have better reading skills at the end of their senior year in high school than those who do

not. Finally, those students who spend less time working in part-time jobs, paid or unpaid, have better reading skills than students who work more.

Although parents and teachers can influence the long-term achievement level of children at every stage of development, early childhood appears to be particularly critical in terms of intellectual development and later school achievement. Using only general measures of the children's educational experiences prior to first grade, the analyses showed that these preschool activities were significantly related to the students' reading level as high school seniors. The importance of the early childhood period in regard to later reading achievement is further illustrated in Table 3. When the nine predictor variables were correlated with high school reading achievement, all showed a relationship. As expected, the highest correlations were with the secondary experiences (variables) since they were closest in time to the criterion measure of high school reading achievement. Unexpected, however, were the findings that (1) preschool home experiences had a higher correlation with high school reading achievement than elementary schooling experiences and, (2) preschool general schooling experiences had a higher correlation than elementary home experiences. Since the elementary experiences were closer in time to the criterion measure, the assumption would be that these experiences should have the higher correlations. This

Table 3. Correlation[1] of predictor variables, SES, and Gender with reading achievement[2] and ranked from high to low by Pearson Zero-Order correlation coefficients.

Predictor Variables	Reading Achievement
Secondary General Schooling Experiences	.3262**
Elem. & Secondary Remedial Experiences	-.2417**
Elem. & Secondary Excelling Experiences	.2183**
Secondary Home Experiences	.2140**
Secondary Discretionary Experiences	-.1920**
Preschool Home Experiences	.1552**
Elementary General Schooling Experiences	.1475**
Preschool General Schooling Experiences	.0932**
Elementary Home Experiences	.0759**
Social Economic Class	.0678**
Gender	-.0136

1 **p<.001
2 Normalized scores on the AIMS reading test in *The Reading Biographer*.

was not so and, hence, confirms the findings of Bloom (1964) and reinforces the argument that early childhood is a critical period in terms of intellectual development and later school achievement.

Summary, Conclusions, and Implications

This study analyzed follow-up data from a longitudinal perspective in terms of home, schooling (including remedial and accelerating) and extracurricular (including organized and unorganized) experiences related to the reading achievement of high school seniors. These experiences consisted of specific behaviors exhibited by parents and/or students that previous studies had shown to be related to the reading achievement of students. These experiences and behaviors were examined at three time intervals corresponding to preschool, elementary, and secondary schooling levels; the patterns of mean reading scores produced by these experiences were identified and related to the reading achievement of 2,177 high school seniors.

The results indicated that many learning experiences found to be related to students' reading achievement during earlier periods of development were also related their reading ability as young adults. In addition, the results reinforced many of the findings of national achievement studies (e.g., *The Reading Report Card: Progress Toward Excellence in Our Schools*, 1985). That is, students who spend more time in educational activities and experiences have better reading abilities than those who spend less time. The findings of this study, however, confirmed the long-term effects of these kinds of experiences on students' reading achievement.

More astonishingly, it confirmed the impact of preschool educational experiences on later reading ability. Preschool home and schooling experiences indicated a significant relationship to adult reading achievement despite using only very general measures and being divorced in time twelve years or more. This was unexpected and has major policy implications for schools in regard to the early childhood curriculum, developmental programs, and school entry age.

The most significant increase in school enrollment rates in the last twenty years has been for three and four year old children. Today, the vast majority of children under the age of five are enrolled in daycare, preschool, or kindergarten programs (Center for Education Statistics, 1987). If there was ever an opportunity for public schools to have a major impact on student achievement and also make a major contribution to the adult literacy rate, it exists at this point in time. Indeed, this should be the challenge of education for the next decade. If an appropriate preschool curriculum was implemented in schools and daycare centers across the United States, immediate effects could be measured in terms of student remediation and drop-out costs for school districts. Long-term effects, which would become apparent in less than ten years time, could be measured in terms of the various costs to society associated with adult illiteracy.

Remedial programs are not only costly for school districts but, as indicated by this study, are negatively

related to adult reading ability in all social class and gender groups. This implies that schools should establish programs that focus on preventing student remediation rather than enhancing or enlarging their remedial and/or developmental programs. Since many schools are placing students in developmental (remedial) classes and/or holding them back at the end of their kindergarten year, the assumption is that preventive programs for children should be implemented as early as three and four years of age. In fact, some school districts, like New York, have already lowered their school entry age requirements and implemented such programs. The findings of this study suggest that this is an excellent policy for school districts.

Overall, the findings emphasize a responsibility to parents, educators, and the students themselves: to provide, participate in, and encourage these kinds of educational experiences. The model was validated across social class and gender subgroups. The predictor variables that contributed to reading achievement of high school seniors, with few exceptions, were common across the social class and gender models.

The implications of this research are generalizable and involve most aspects of the students' environment. The fact that significant differences in adult reading competence can be attributed to the level of involvement in particular "alterable" experiences across development, independent of the student's social class background, gender, or high school

attendance center have direct policy implications, particularly in regard to school curricula, entry age, remediation programs, and retention/promotion practices. The model enables educators and parents to assess, evaluate, and improve the quality of students' reading achievement by focusing attention on those reading-related activities that can be modified or changed and not background characteristics (e.g., social class). It also provides considerable relevant information for parents and schools about instruction for all students, including when formal instruction should begin and what kinds of experiences are important to subsequent reading progress at each schooling level over an extended period of time. Finally, the study provides new methodological approaches of potential value to schools and program evaluators. With little additional costs, for example, a school district could regularly survey students and evaluate the experiences important to their reading progress and develop/adopt their programs to capitalize on the results.

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